Getting Started

Welcome to the USP expansion system for the ZX Spectrum. Now you can add multiple cards to your SPECTRUM.

There is basically nothing to installing the USP-BBP3 although we do advise using a power supply separate from the Spectrums own. If you already have one of our cards don't forget to change the link so it can be addressed properly when plugged into the BBP3 also the addresses will differ. (You did put that bit of your program in an easily altered subroutine didn't you!).

PROBLEMS!

If your board is obviously defective – ie won't run test programs then please return it to us registered post for repair of replacement. This will be done free of charge for the first 12 months from purchase (have you returned the warranty card yet!). After that a bill will be sent and the board repaired on receipt of payment. We often find boards returned with nothing wrong – please try and save your and our time by double checking.

Technical Support

Obviously this is a problem on any low cost but technically advanced product. We will undertake to reply to any written and specific queries you send in, whether by post or telex, within a reasonable time. Sorry but we will not provide free consultancy over the phone!

We are also very pleased to receive any written comments on the products themselves, the documentation or the software. Please let us know if you find any bugs in the software aswell.

Now let's really get down to the "hard" stuff (and the soft kind of course)…….

p.s   The other thing we're always interested in is ideas or even designs for new products.

This backplane provides 3 fully buffered card slots for the USP range of Spectrum interface cards manufactured by U-Microcomputers Ltd. A 4 slot extension backplane is also available which when connected to the USP-B3P3 extends the numbers of card slots to 7.

The onboard logic of the USP-BBP3 provides buffering for the address, data and control lines present at the rear edge connector of the Spectrum. In addition, card slot address decoding is provided for up to 7 interface cards. An unbuffered edge connector is provided to enable the connection of the ZX Printer and/or Microdrives.

Card Slot Addressing

The addressing scheme used on all the USP range of interfaces is shown diagramatically below:-

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
X	X	X	X	r	r	r	r	n	n	n	l	l	l	l	l

XXXX = don't care
rrrr = Interface internal address (if any)
nnn = Card slot address (slot 0 to slot 5)

Address bits 0 to 4 are always set to 1.

Using this addressing scheme the base address of any interface card plugged into slot n of the backplane can be calculated using the formula given below

$$(n \times 32)+31$$

Where n is in the range 0 to 6.

This base address will be modified if the interface in question has internally addressed registers. In these cases the complete formula for calculating an address on an interface card is

$$(r \times 256)+(n \times 32)+31$$

where r is the interface's register address in the range 0 to 15.

Using USP cards on the backplane

Before a USP interface card can be used on the backplane it's address selection link has to be positioned to accept the slot select signal. This signal is generated by the backplane logic using the address bits 5 to 7. USP interfaces are normally shipped with the address selection link positioned for direct connection of the interface to the rear edge connector of the Spectrum. In this position the slot address recognised by the interface is always 6.

Power Supplies

The USP-BBP3 is designed for use with a separate power supply. It is not advisable to accept to power the backplane from the internal power rails of the Spectrum.

A suitable power supply (USP-PSU) is available from U-Micrcomputers Ltd or their dealers. For those wishing to provide their own power supply unit it is recommended that it supplies the following outputs:-

approx   +9v at 1 amp unregulated
                +5v at 3 amps ± 0.2v
   +12v at 1 amp ± 0.5v

-12v at 1 amp $\pm$ 0.5v

The 12 volt outputs are optional but certain USP interface cards require these voltages. The 9 volt unregulated output is used to power the Spectrum and ZX Printer. This allows you to discard the power unit supplied with the Spectrum.

A six pin molex type plug is mounted on the backplane for power supply connections. A diagramatic representation of the plus is given below.

|			
+5V	O_1	$_4O$	+9V
+12V	O_2	$_5O$	GND
−12V	O_3	$_6O$	GND
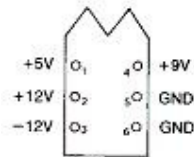
Power supply links (L1 to L4) are also provided, these are located to the left of the power connector. They are provided to allow flexibility in your power arrangements. The normal link configuration when using the USP-PSU is shown below.

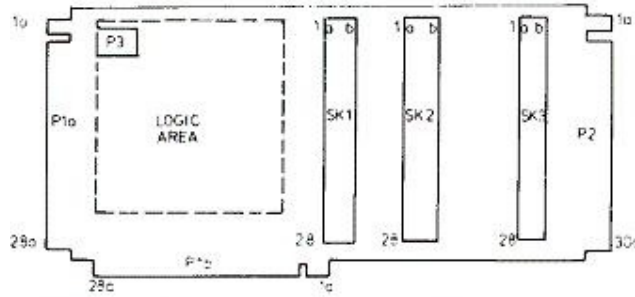| to/from Spectrum	exp slots	ext psu
L1 o——————o	——————o +9V
L2 o	o——————o +5V
L3 o	o——————o +12V
L4 o	o——————o −12V
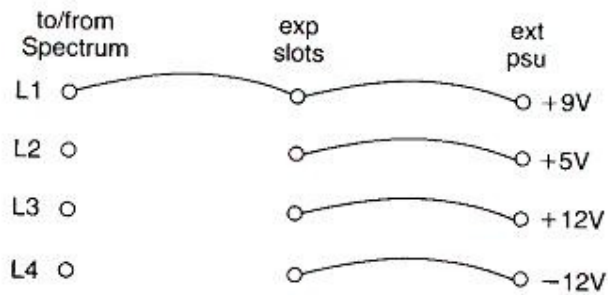
N.B.   With this link configuration, supplies to the ZX Printer/Microdrives connector are derived from the Spectrums rear connector. The -5V supply available at the rear of the Spectrum is bussed through to the card slots.

Circuit diagram USP-BBP3
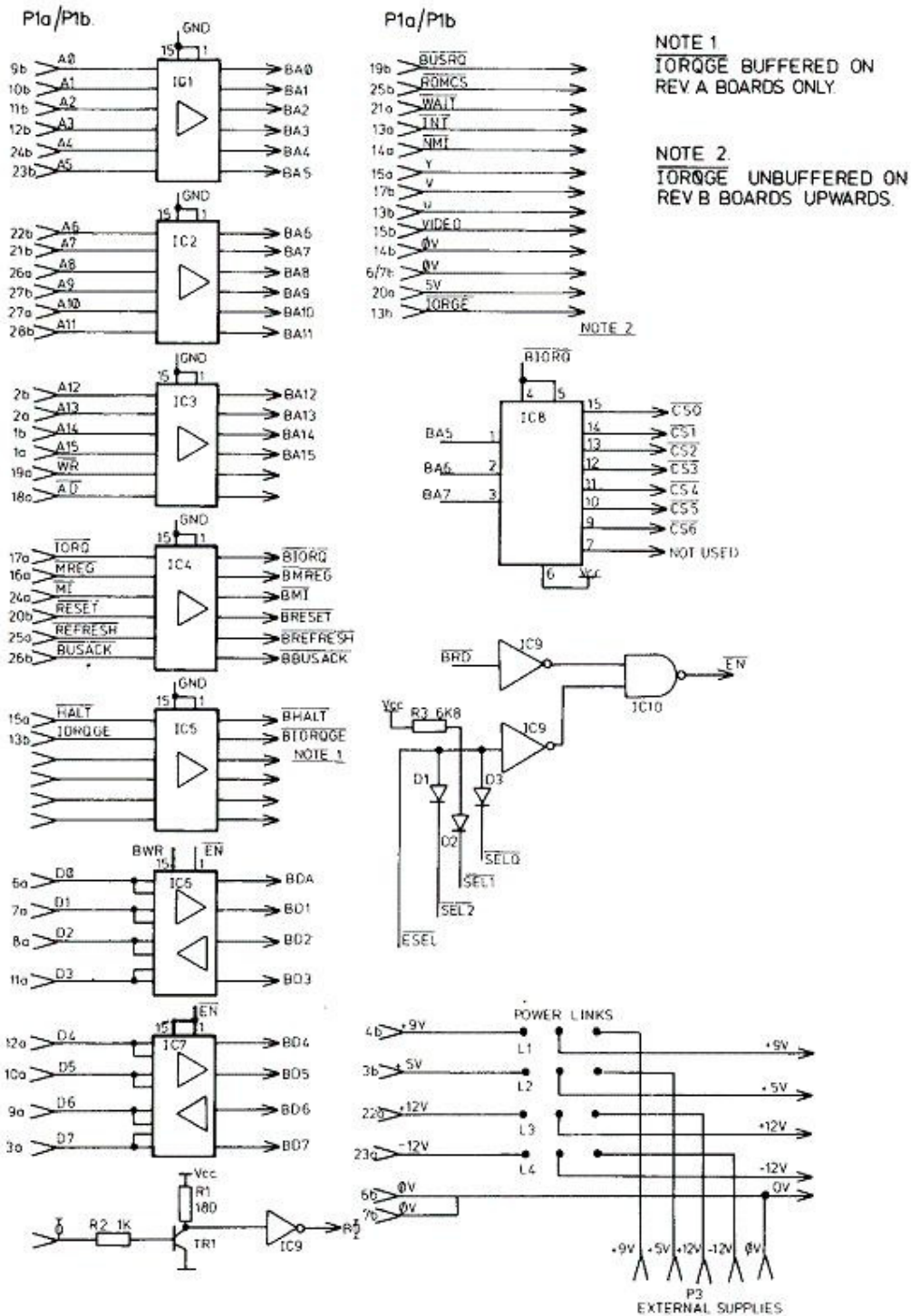
SUGGESTED BOARD LAYOUT.

NB P1a. PLUG TO SPECTRUM BACK PLANE
    P1b. PLUG FOR PRINTER DISC/DRIVES
    P2   PLUG TO 4 SLOT EXTENSION BOARD
    SK1-3. BUFFERD SOCKET FOR INTERFACE CARDS
    POLARISING KEY IN POSITION 5.

P1a.	**P1b.**			**SK.1. 2. 3.**				**P2.**			
1a	A15	1b	A14	1a	BA15	1b	BA14	1a	BA15	1b	BA14
2a	A13	2b	A12	2a	BA13	2b	BA12	2a	BA13	2b	BA12
3a	D7	3b	5V	3a	BD7	3b	5V	3a	BD7	3b	5V
4a	NC	4b	9V	4a	CS 0.1.2.	4b	9V	4a	NC	4b	9V
5 LOT		5 LOT		5 LOT		5 LOT		5 LOT		5 LOT	
6a	D0	6b	0V	6a	BD0	6b	0V	6a	BD0	6b	0V
7a	D1	7b	0V	7a	BD1	7b	0V	7a	BD1	7b	0V
8a	D2	8b	φ	8a	BD2	8b	Bφ	8a	BD2	8b	Bφ
9a	D6	9b	A0	9a	BD6	9b	BA0	9a	BD6	9b	BA0
10a	D5	10b	A1	10a	BD5	10b	BA1	10a	BD5	10b	BA1
11a	D3	11b	A2	11a	BD3	11b	BA2	11a	BD3	11b	BA2
12a	D4	12b	A3	12a	BD4	12b	BA3	12a	BD4	12b	BA3
13a	INT	13b	IORQGE	13a	INT	13b	BIORQGE	13a	INT	13b	BIORQGE
14a	NMI	14b	0V	14a	NMI	14b	0V	14a	NMI	14b	0V
15a	HALT	15b	VIDEO	15a	BHALT	15b	VIDEO	15a	BHALT	15b	VIDEO
16a	MREQ	16b	Y	16a	BMREQ	16b	Y	16a	BMREQ	16b	Y
17a	IORQ	17b	V	17a	BIORQ	17b	V	17a	BIORQ	17b	V
18a	RD	18b	U	18a	BRD	18b	U	18a	BRD	18b	U
19a	WR	19b	BUSRQ	19a	BWR	19b	BUSRQ	19a	BWR	19b	BUSRQ
20a	-5V	20b	RESET	20a	-5V	20b	BRESET	20a	-5V	20b	BRESET
21a	WAIT	21b	A7	21a	WAIT	21b	BA7	21a	WAIT	21b	BA7
22a	+12V	22b	A6	22a	+12V	22b	BA6	22a	+12V	22b	BA6
23a	-12V	23b	A5	23a	-12V	23b	BA5	23a	-12V	23b	BA5
24a	MI	24b	A4	24a	BMI	24b	BA4	24a	BMI	24b	BA4
25a	RFSH	25b	ROMCS	25a	BRFSH	25b	ROMCS	25a	BRFSH	25b	ROMCS
26a	A8	26b	BUSACK	26a	BA8	26b	BUSACK	26a	BA8	26b	BUSACK
27a	A10	27b	A9	27a	BA10	27b	BA9	27a	BA10	27b	BA9
28a	NC	28b	A11	28a	SEL0.1.2.	28b	BA11	28a	ESEL	28b	BA11
								29a	CS3	29b	CS4
								30a	CS5	30b	CS6